Practice Problems for Algebra
from www.topmath.info

1 Find the largest integer G such that $10G - 85 < 0$.

2 If g and h are real numbers, not equal to 0, such that the product of g and 6 is h, what is the sum of 6 and g in terms of h?

3 Some children are dividing a number of toy trucks. If each child gets 9, then there will be 3 toy trucks left over. However, 3 children do not want to participate, so the toy trucks will be split among the others. Each child will get 12 toy trucks, and there will be 6 remaining. How many toy trucks are there altogether?

4 If vases cost 20 dollars each, and card tables cost 28 dollars each, what is the cost of X vases and Y card tables?

5 If $11/18 = 11/(q+18)$, what is q?

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6 What is 42x^7y^5 divided by 6x^4y^2 ?

7 If y = 10x - 4, what is the value of y when x = 6 ?

8 What is the value of 6q if q = 11s and s = 4?

9 What is the value of -8s if s = 6u + 5 and u = 7?

10 What is the value of 11p if p = -5q - 5 and q = 3?

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11 Let f(x) = x + 9, and let g(x) = (x^2 - 81)/(x - 9). What is the difference between these two functions?

12 We define a new operator, @, such that a @ b = a^b - b^a. What is 1 @ 4?

13 Let s and t be positive integers, with s>t. Define an operation @ as follows: s@t = 2^(s+t) / 2^(s-t). What is 3@3 ?

14 (T/F): 8 < 12

15 (T/F): -9 < -7

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1 ANSWER: 8. EXPLANATION: The expression 10G - 85 equals 0 when G = 17/2. The largest integer smaller than this fraction is 8.

2 ANSWER: 6 + h/6. EXPLANATION: The problem asks for the sum of 6 and g, which is obviously 6 + g. However, it asks for this sum in terms of h. Since we know that 6g = h, then g = h/6, and we can use this equation to substitute for g to get the answer in terms of h.

3 ANSWER: 102. EXPLANATION: Let n be the total number of children. If each child gets 9 toy trucks, there will be 3 toy trucks left over, so the number of toy trucks is 9n + 3. From the second part of the problem, we know that the total number of toy trucks is also 12(n - 3) + 6. Therefore, 9n + 3 = 12(n - 3) + 6. We solve this to get n=11. We then plug this value for n into the formula 9n + 3 to find the total number of toy trucks.

4 ANSWER: 20X + 28Y. EXPLANATION: The cost of the vases is 20X, and the cost of the card tables is 28Y.

5 ANSWER: 0. EXPLANATION: Because the numerators on both sides of the equals sign are the same, the denominators must also be the same. Therefore, we simply need to solve the equation q+18=18.

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6 ANSWER: 7x^3y^3. EXPLANATION: Divide the 42 by 6, the x^7 by x^4, and the y^5 by y^2. Remember that you divide exponents by subtracting.

7 ANSWER: 56

8 ANSWER: 264. EXPLANATION: If q = 11s and s = 4, then we substitute 4 for s and find that q = 11×4, or 44. Since the question asks us to find the value of 6q, we simply multiply 6 by 44 to get the answer.

9 ANSWER: -376. EXPLANATION: If s = 6u + 5 and u = 7, then we substitute 7 for u and find that s = 6×7 + 5, or 47. Since the question asks us to find the value of -8s, we simply multiply -8 by 47 to get the answer.

10 ANSWER: -220. EXPLANATION: If p = -5q - 5 and q = 3, then we substitute 3 for q and find that p = -5×3 - 5, or -20. Since the question asks us to find the value of 11p, we simply multiply 11 by -20 to get the answer.

11 ANSWER: The functions are identical, other than g(x) being undefined where x=9..
EXPLANATION: Divide the denominator of g(x) into the numerator of g(x) to see that the functions appear to be identical. However, note that g(x) is undefined when the denominator is 0, because division by 0 is undefined.

12 ANSWER: -3. EXPLANATION: By the definition of the function, 1 @ 4 = 1^4 - 4^1. We know that 1^4=1, and 4^1=4. We then subtract to find the difference.

13 ANSWER: 64. EXPLANATION: In this case, the value of s does not matter. The difference between the exponents in the numerator (s+3) and the denominator (s-3) will always be 6. Therefore, when you divide the numerator by the denominator, your answer will be 2^6, regardless of the value of s.

14 ANSWER: True

15 ANSWER: True